A NEW COUNTY BIRD-BOOK.[1]

A BOOK on the birds of Hampshire and the Isle of Wight fills up a blank in the list of English county avifaunas, and is a particularly interesting instalment of the series. Few, if any, districts in Great Britain surpass this in the attractions it possesses for the field naturalist, its natural features presenting a greater variety than is usually to be found in an area of similar limitations, large though this county is. If it boasted of nothing more than the far-famed New Forest, the happy hunting-ground of so many naturalists, Hampshire would furnish material for a good bird-book. But in addition to its woodlands it embraces open downland and hills, cultivated country and a varied coast-line including the muddy estuaries and harbours of the mainland and the famous cliffs of the "Island." It is not, therefore, surprising to find the district credited with a list of 127 resident birds and summer visitors, which remain to breed, in addition to 70 winter visitors, 36 occasional visitors, and 61 species of so rare occurrence that the authors are obliged to attribute their appearance to accident. With regard to the occurrence of rare visitors on migration, the authors point out that the lighthouses and vessels (to which are due the discovery of so many waifs) on this coast are not good stations for observation.

Hampshire has not been less fortunate in her naturalists and her natural historians than in her natural features. From the days of Gilbert White onwards the birds of Hampshire have been studied and loved by many notable people. Hardly less known than the "Natural History of Selborne," we have the immortal "Instructions to Young Sportsmen" of Colonel Peter Hawker, and his more recently published "Diary"; Gilpin's "Forest Scenery" and Wise's "History of the New Forest." These, added to the writings on local birds of the Rev. C. Bury, Captain Henry Hadfield, Prof. T. Bell, Mr. A. G. More, the Rev. Richard Warner, Mr. G. B. Corbin, Mr. E. G. B. Meade-Waldo, and others, have furnished the authors with a wealth of material stretching back to a time when little attention was paid to ornithology. But besides these more pronounced naturalists, famous men of letters, and women, too, have made some mention of Hampshire birds—Kingsley and Tennyson, and Jane Austen and Charlotte Yonge—while the modern maker of books has not left them alone.

In collections, too, the county is rich, and that of Mr. E. Hart (without whose assistance no history of Hampshire birds could be complete) at once suggests itself as of preeminent importance. The strictly local collection at Heron Court contains many historical specimens, while the eggs owned by Dr. Rake are of exceptional interest, many of them being referred to in Wise's "History of the New Forest." The work has been excellently planned and carried out. With such a wealth of historical facts available the authors proposed not only to deal with the birds as they exist at this moment, but to trace their history in the writings of those who have gone before them. The "Natural History of Selborne" forms the backbone of the work, and we have here for the first time what White has to say (not only in his book, but also in his still unpublished "Journal of Observations") about the birds of Selborne arranged in scientific order.

Of the more interesting species the authors have given very extended notices, and of all these the honey buzzard is the most important, on account of its having been found in former years more commonly in this county than in any other part of England. Among other birds of which valuable accounts are given may be mentioned the raven, buzzard, hobby, Montagu's harrier, cirl bunting, hoopoe, and great bustard. The breed of peregrines for which the Isle of Wight was famous in the old days of hawking still keeps a footing there; and to turn from decreasing species, it is pleasant to read that the redshank is increasing as a resident; that White's "clamouring" favourite, the stone curlew, is happily still plentiful, and that the woodcock, shoveller, and tufted duck are becoming more numerous as breeding species. But whether the great increase in numbers of the black-headed gull will prove an unmixed blessing is perhaps open to doubt.

FIG. 1.—Black-headed Gull. From "The Birds of Hampshire and the Isle of Wight.' From a photograph by Mr. Smith Whiting.

A curious account is given of some merlins breeding in Hampshire in the early 'sixties. The nests, which were stated to have been found in such previously unheard-of situations as pollard hollies, and holes in yew and beech trees, contained three eggs in each instance. We should certainly have been inclined to refer these eggs to the kestrel had not the male bird been shot from the nest in one instance, and had not its skin, together with the eggs, been

[1] "The Birds of Hampshire and the Isle of Wight." By the Rev. J. E. Kelsall, M.A., and Philip W. Munn. Pp. xliv+371; illustrated. (London: Witherby and Co., 1905.) Price 15s. net.

still in existence. An interesting introduction closes with an account of the laws applying to local birds; and the volume is embellished with a map of the district, four drawings by Mr. G. E. Lodge, and reproductions of some most beautiful photographs of birds by Mr. Smith Whiting, one of which we are enabled to reproduce. O. V. APLIN.

THE ADULTERATION OF BUTTER.

DURING the last few years much unscrupulous ingenuity has been applied to the sophistication of butter. Both on the Continent and in this country the adulteration of this, the best of edible fats, has developed into quite an industry, having its own factories and its own chemists, and conducting its operations on a scale which, for a furtive, dishonest business, is really of remarkable magnitude. Considerable profits are alleged to be made, and it is therefore not surprising that the traffic has flourished in spite of all attempts at suppression. Perhaps it may be of interest to those readers of NATURE who are not chemists to have placed before them, with as little technicality as may be, a sketch of the modern methods of butter-adulteration, and of the means adopted or suggested to checkmate this form of fraud. The importance of the matter both to the consumer and the agriculturist may be pleaded as a justification for discussing the question at some little length.

Butter, though consisting essentially of the fat of milk, is always associated during manufacture with more or less water, the quantity of which ranges generally from 7 to 15 per cent. One of the simplest forms of adulteration consists in working an excessive proportion of water into the butter. To check this is comparatively easy; a maximum limit of 16 per cent. has been fixed by the Board of Agriculture, and persons dealing in butter containing more water than this are liable to prosecution.

There exists, however, an insidious variant of this water-logging in the production of what is called "milk-blended" butter. In preparing this, skim milk, costing about a penny per gallon, is largely used. It may either furnish curd to be incorporated with the butter, or, after a little "ripening" with micro-organisms to improve the flavour, it may be used for direct admixture. By working up butter with such milk a product may be obtained containing 25 to 30 per cent. of water, as well as a substantial quantity of curd. The proportion of butter-fat in such a mixture will often be less than 65 per cent., whereas ordinary butter contains from 80 to 90 per cent. Yet the sale of the article is not, legally, a fraudulent transaction, provided the substance is sold as "milk-blended" butter, and not simply as "butter." At first sight this may seem reasonable enough; the purchaser is told what he is buying, and for the rest—well, *caveat emptor*. But, after all, some regard should be had to attendant circumstances. It is the poor who chiefly consume the manipulated butter, and neither they, nor, indeed, any ordinary purchaser, would realise that the fat-value of the blended article is only about three-fourths of that of genuine butter. Of course, if the price is correspondingly lower there is no fraud. But the contention of those who oppose the sale is that there is always a substantial margin of unfair profit; "milk-blending," in fact, is held to be essentially a device for supplying an excessive proportion of water, relative to the amount of fat, without incurring the penalties provided for infringemen of the Sale of Butter Regulations.

Be this as it may, a measure to prohibit the use of the word "butter" for such mixtures, on the ground that it is a misleading description, was brought forward two or three sessions ago, only to be sacrificed to the exigencies of politics. It remains to be seen whether a better fate is in store for it under the new Administration.

Perhaps, however, the most frequent, and certainly the most troublesome, sophistication of butter consists in the admixture with it of fat other than that of milk. There are two chief adulterants of this class now in use. One is a soft fat obtained from beef-suet by removal of the harder "stearin" portions; this fat may sometimes be mixed with or replaced by lard, and is generally churned up with water (or with milk) to facilitate the subsequent "blending." The other adulterant is a refined cocoa-nut "oil" or fat, purified so as to be practically tasteless. These substances, supplied at about half the price of butter, are variously known as "mixing article," "enricher cream," "neutral fat," or "neutral blending," and are carefully prepared to simulate butter in consistency. A still more subtle adulterant is formed by a judicious mixture of the two, which yields analytical figures identical in some respects with those of genuine butter. Let us examine this a little more closely.

Chemically, butter-fat consists of a mixture of glycerides—that is to say, compounds of fatty acids with glycerin. For instance, one such glyceride may, with sufficient accuracy for our present purpose, be represented as the following combination :—

Glycerin + Oleic acid, Palmitic acid, Butyric acid } *minus* water.

When these acids are freed from their chemical union with the glycerin, the butyric acid is found to be sharply distinguished from the other two by the fact that it is soluble in water and volatile on distillation with steam. Now the chief difference between butter-fat and other fats lies in the comparatively high proportion of butyric acid (and similar volatile acids) which the butter-fat contains. The following summary represents the composition of a specimen of the prepared beef-fat and of two samples of butter-fat :—

	Prepared beef-fat	Butter-fat	
		No. 1	No. 2
	Per cent.	Per cent.	Per cent.
Volatile or soluble acids	Practically nil	5·0	6·7
Insoluble acids	95·5	90·0	88·0
Glycerin	10·9	12·1	12·7
	106·4	107·1	107·4
Less combined water	6·4	7·1	7·4
	100·0	100·0	100·0

Like other natural products, the fat of milk varies in the proportions of its components, and the two samples here quoted show the range of variation met with in ordinary butter. Analytically, No. 1 is butter of low quality; No. 2, on the other hand, is above the average. The difference consists, as will be seen, in No. 1 containing less volatile acids, less glycerin, and more insoluble acids than No. 2. These are precisely the directions in which beef-fat differs from butter-fat. Broadly, one may say that, analytically, the first specimen of butter has more of a beef-fat character than the second.

This is the point which the adulterator seizes upon. "If," he argues, "I start with butter No. 2, I can add to it quite a considerable quantity of my prepared beef-fat before the mixture shows a smaller percentage of volatile acids than butter No. 1 contains; and since No. 1 is perfectly genuine butter, it is difficult to see how any analyst will be able to swear that my mixture is not also genuine butter." Indeed, the analyst often finds it no easy matter to expose the